


UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604

DATE: NOV 10 2014

SUBJECT: Clean Air Act Inspection at Duke Zimmer Station – Moscow, Ohio

FROM: Ethan Chatfield, Environmental Engineer
Air Enforcement and Compliance Assurance Section (IL/IN)

THRU: Nathan Frank, Chief 
Air Enforcement and Compliance Assurance Section (IL/IN)

TO: File

Date of Inspection October 1, 2014

Attendees Ethan Chatfield, EPA - Region 5, Clean Air Act Air (CAA) Inspector
Patrick Miller, EPA - Region 5, CAA Inspector
Andrew Roebel, Duke Energy Air Compliance Specialist (Manager)
Joe Lauer, Duke Energy Production Manager Zimmer Station
Tara Thomas, Duke Energy, Environmental Coordinator Zimmer Station
Ray Rohrer, Duke Energy Production Coordinator (before was FGD Coordinator)

Purpose of Inspection

To determine compliance with the Clean Air Act and conduct Method 9 opacity readings on the main boiler stack.

Company Description and Background

Physical Location: Duke WH Zimmer Station
1781 U.S. Route 52
Moscow, Ohio 45153

Phone Number: (513) 467-5258

Primary Contact: Joe Lauer
Production Coordinator, WH Zimmer Station

Opening Conference

EPA inspectors (Ethan Chatfield and Patrick Miller) noted significant opacity emanating from the main boiler stack upon entering at the main plant gate. EPA inspectors stopped near the

parking lot on the entrance road and took Method 9 VE readings (see Attachment 1) prior to entering the gatehouse and secured plant grounds.

EPA inspectors arrived at the gatehouse at approximately 2:35 PM and waited approximately 30 minutes while plant environmental staff were called. EPA was met at the gatehouse and directed to a conference room where they were told that they needed to wait another 30 minutes for Andrew Roebel, Duke's Air Compliance Environmental Specialist ~~told me~~ from Duke's Cincinnati office. While waiting, Ms. Thomas informed EPA that Duke sold their share in the Zimmer plant and Dynegy would be taking over the plant and all personnel starting December 31, 2014 (or sooner). Mr. Lauer stated that it has been difficult to keep plant staff motivated. AEP and DP&L will still own 54% of the Zimmer plant, however Dynegy will now own Duke's 46% share. Mr. Lauer also informed EPA that Duke's Beckjord plant was officially shutdown on September 1, 2014.

Mr. Roebel arrived and inspectors continued asking questions. Mr. Lauer and Ms. Thomas then assisted EPA in drawing a diagram of the boiler and emission controls on the main boiler (see inspector notes). Ms. Thomas explained there is no longer any bypasses for the FGD modules. All bypasses were "blanked off," "years ago." Mr. Lauer and Ms. Thomas could not remember the exact date. Ms. Thomas stated that there are 3 SCR modules, 2 ESPs, and 6 FGD absorber modules. The flue gas splits just prior to entering the two ESPs and then is reunited just prior to splitting again into the 6 absorber modules.

EPA explained that they noted a significant plume of what appeared to be sulfuric acid emissions upon entering the plant and took EPA Method 9 opacity readings near the cooling tower prior to entering the gatehouse. Mr. Lauer stated that they just came off a "maintenance outage" yesterday (from Sept 19th to Sept 30th) on the main boiler and finally reached full temperature overnight. EPA asked if the plant's SO₃ mitigation system is/was operating and were told they would check to verify. Mr. Chatfield asked if the SO₃ mitigation system is usually operated during start-up and was told that it is generally run anytime the SCR is running. Mr. Chatfield noted that Method 9 readings indicate that opacity exceeded the plant's 20% limitation and hence EPA concern over what appeared to be a sulfuric acid mist plume. Ms. Thomas stated that Duke does not have any SO₃ emission limits. Mr. Chatfield stated that if the SO₃ emissions caused an exceedence of an applicable opacity limit then Duke does have a requirement to operate its SO₃ mitigation system.

Mr. Chatfield asked if any projects were completed to increase scrubber efficiency. Mr. Lauer explained that in or around 2006 Duke completed a scrubber efficiency project. This project resulted in additional absorber recirculation pumps, trays, and other scrubber work to increase overall scrubber efficiency. Mr. Chatfield asked if Duke completed work to increase scrubber efficiency and why was emission rates reported under the Acid Rain program not showing a more substantial drop in SO₂ emissions? Mr. Lauer stated that only the *potential* to scrub harder was added, more product and power is needed to achieve higher removal efficiencies. Mr. Chatfield requested a copy of any reports related to the scrubber efficiency project (EPA was later contacted by Alexander Scott, outside counsel for Duke regarding this request).

EPA asked when the Zimmer Station's last major planned outage occurred. Mr. Lauer stated that there was a 6-7 week outage in 2012 during which the LP turbine was replaced (new rotor and blading) and a new horizontal reheater was replaced. This was the first time in the history of the unit that the reheater has been replaced and it was replaced in its entirety.

Mr. Roebel confirmed that the total stack height was 573 feet.

Inspection

At approximately 4pm, Duke staff and EPA inspectors exited through the back, east side of the main building, got into a truck, and drove past the boilerhouse and SCRs, to the base of the main stack and FGDs. At the base of the main stack, the group was met by a Ray Rohrer, the production coordinator (previously the FGD coordinator). Ray explained that there are three locations that dry sorbent is injected into the flue gas stream to mitigate SO₃ emissions.

Mr. Rohrer confirmed that Duke modified the FGD in 2005/6 during which time they blocked the bypass dampers on all of the FGD modules, increased the absorber recirculation pump capacity, and changed the tray and spray configurations. Mr. Chatfield asked why EPA is not seeing a marked increase in SO₂ removal. Mr. Rohrer explained that the FGD was upgraded for a 96% removal, but ended up achieving removal rates in the high 95s. The plant strives to achieve an average of 92.5% to ensure compliance. Mr. Chatfield further questioned as to why removal rates during startup are so poor if there is no longer any bypassing. Mr. Rohrer explained that it often takes time to "get the chemistry up" during the first 24 hours after the unit comes online. The scrubber liquid is 'diluted' when the unit is shut down and it takes time to get the magnesium levels in the water high enough. Mr. Rohrer explained that if their removal rate drops below 25% when starting up then they are forced to take the unit back offline. They could truck in some synthetic magnesium and spike the scrubber liquid, but that would/could be costly and therefore is not done. Mr. Rohrer stated that the plant is still in startup and there is no ammonia flow and hence higher opacity. Mr. Rohrer stated that a contractor, working Monday thru Friday tells Duke which injection port to inject the sorbent for SO₃ removal. Duke usually starts up with 4 of the 6 scrubber modules, then adds one additional module during full load operation. There is usually one module down for service at all times.

Duke staff and EPA inspectors walked the perimeter of the FGD modules and returned to the truck due to lack of time. On the way back to the office Mr. Lauer noted the hydrated lime silos and the injection system on the side of building (see Attachment 2 Photos).

Closing Conference

At the end of the inspection, Duke personnel and EPA inspectors convened back in the main conference room. Mr. Roebel copied all photos taken by EPA onto his laptop and EPA explained that an inspection report would be written detailing the observations made during the inspection. Mr. Chatfield explained that the report would not contain any compliance determinations. Mr. Miller explained that an additional information request may follow this inspection, if deemed necessary. Mr. Roebel asked if Duke could obtain a copy of the inspection report. EPA explained that Duke could submit a Freedom of Information Act Request for a copy of the report,

but should wait a few weeks since the reports are not always done immediately upon returning to the office.

Attachments

Attachment 1 – Original and typed VE Field Observation Forms.

Attachment 2 – Photos.

Attachment 3 – Documents provided by Duke (post inspection via email).

METHOD 9 VISIBLE EMISSION OBSERVATION FORM

Date: 10/1/2014
 Observer: E. Chatfield
 Affiliation: US EPA

Source name: Duke - Zimmer Station
 Source address: 1781 US Hwy 52
Moscow OH 45153

Facility type: Coal-fired power plant

Emission location (stack, roof, etc.): stack	Estimated emission location height: 573 feet
Direction from emission location: S to SW	Estimated distance to emission location: 2,200 feet

Plume color: **bluish white**
 Background: **sky**
 Background color: **blue**

Sky color: **blue**
 Cloud color: **None.**

Estimated wind speed: **6.9 mph**
 Approximate wind direction: **S**

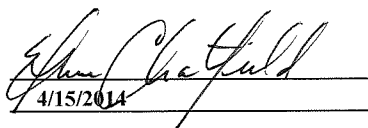
Temperature: **73.4 F**

Additional Comments
 (photos/video taken, etc.):
Photos taken during observations.

Time	Minute	Seconds				6-min	Comments
		0	15	30	45	Avg	
1:59pm	1	35	55	50	60		
	2	65	65	60	50		
	3	50	45	35	35		
	4	40	45	35	30		
	5	30	35	30	30		
	6	20	25	20	20	40	
	7	25	20	25	25		
	8	25	35	20	15		
	9	20	20	15	15		
	10	10	10	20	20		
	11	25	25	30	25		
	12	20	10	10	20	20	
	13	20	20	20	15		
	14	20	25	20	20		
	15	25	25	20	25		
	16	40	40	40	40		
	17	45	50	45	35		
	18	35	35	35	30	30	
	19	35	25	25	30		
	20	35	40	35	35		
	21	45	40	35	35		
	22	40	40	40	30		
	23	40	50	45	35		
	24	20	25	40	40	36	
	25	40	40	40	50		
	26	40	20	25	30		
	27	40	25	20	35		
	28	30	30	25	30		
	29	20	35	30	25		
2:29pm	30	30	20	15	25	30	

Signature:

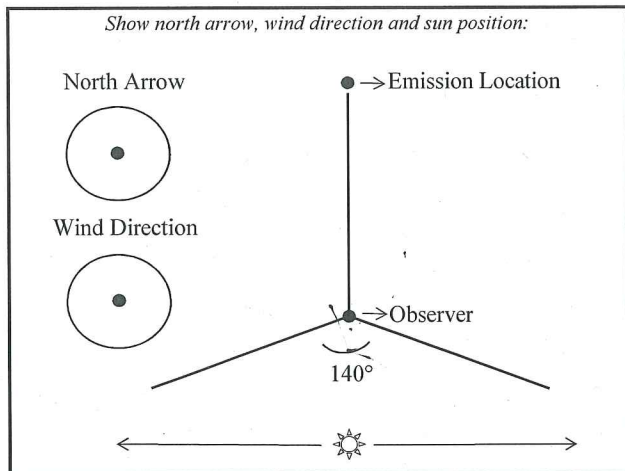
Date last certified:


 4/15/2014

METHOD 9 VISIBLE EMISSION OBSERVATION FORM

Date: 10/1/2014
 Observer: E. Chaffield
 Affiliation: U.S. EPA

Source name: Duke Zimmer Station
 Source address: _____
 Facility type: _____



Emission location (stack, roof, etc.): stack Estimated emission location height: 573 feet
 Direction from emission location: South to Southwest Estimated distance to emission location: ~2,200 feet

Plume color: white-bluish white
 Background: blue sky
 Background color: Blue

Sky color: Blue
 Cloud color: None

Estimated wind speed: 6.9 mph
 Approximate wind direction: SW

Temperature: 73.4 °F

Additional Comments
 (photos/video taken, etc.):
pics taken

40 C.F.R. Part 60, Appendix A, Reference Method 9

2.3 Observations. "Opacity observations shall be made at the point of greatest opacity in that portion of the plume where condensed water vapor is not present."

2.3.1 Attached Steam Plumes. "When condensed water vapor is present within the plume as it emerges from the emission outlet, opacity observations shall be made beyond the point in the plume at which condensed water vapor is no longer visible. The observer shall record the approximate distance from the emission outlet to the point in the plume at which the observations are made."

2.3.2 Detached Steam Plume. "When water vapor in the plume condenses and becomes visible at a distinct distance from the emission outlet, the opacity of emissions should be evaluated at the emission outlet prior to the condensation of water vapor and the formation of the steam plume."

"On an overcast day when no shadows are observed and the lighting is diffuse or flat, this rule might not be as important from a scientific standpoint as on a bright, sunny day. Observers might have trouble defending their positions in court if they disregard the rule. The best practice for an observer is to always have the sun at his or her back, even if it is not visible and no shadows are cast." <http://www.epa.gov/ttn/emc/methods/VECourse.pdf>

Time	Minute	Seconds				Steam Plume?		Comments
		0	15	30	45	Attached	Detached	
11:59	1	35	55	50	60	✓		taken in parking lot by cooling tower
	2	65	65	60	50	✓		
	3	50	45	35	35			
	4	40	45	35	30			
	5	35	35	30	30			
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	29	20	35	30	25			
2:29	30	30	20	15	25			

(Continued on other side →)

Signature: _____
 Date last certified: 4/15/14

Time	Minute	Seconds				Steam Plume?		Comments
		0	15	30	45	Attached	Detached	
	31							
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Appendix 2: Photos



Photo No.	Date and Time:	Description:
IMG_0313	Oct 1, 2014 at 1:59 PM	Main Boiler (B006) Plume



Photo No.	Date and Time:	Description:
PA010021	Oct 1, 2014 at 1:59 PM	Main Boiler (B006) Plume



Photo No.	Date and Time:	Description:
PA010022	Oct 1, 2014 at 2:00 PM	Main Boiler (B006) Plume



Photo No.	Date and Time:	Description:
PA010023	Oct 1, 2014 at 2:00 PM	Main Boiler (B006) Plume



Photo No. PA010024	Date and Time: Oct 1, 2014 at 2:00 PM	Description: Main Boiler (B006) Plume
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Photo No. PA010026	Date and Time: Oct 1, 2014 at 2:01 PM	Description: Main Boiler (B006) Plume
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Photo No. PA010032	Date and Time: Oct 1, 2014 at 2:14 PM	Description: Main Boiler (B006) Plume
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Photo No. PA010033	Date and Time: Oct 1, 2014 at 2:21 PM	Description: Main Boiler (B006) Plume
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Photo No. PA010034	Date and Time: Oct 1, 2014 at 2:25 PM	Description: Main Boiler (B006) Plume
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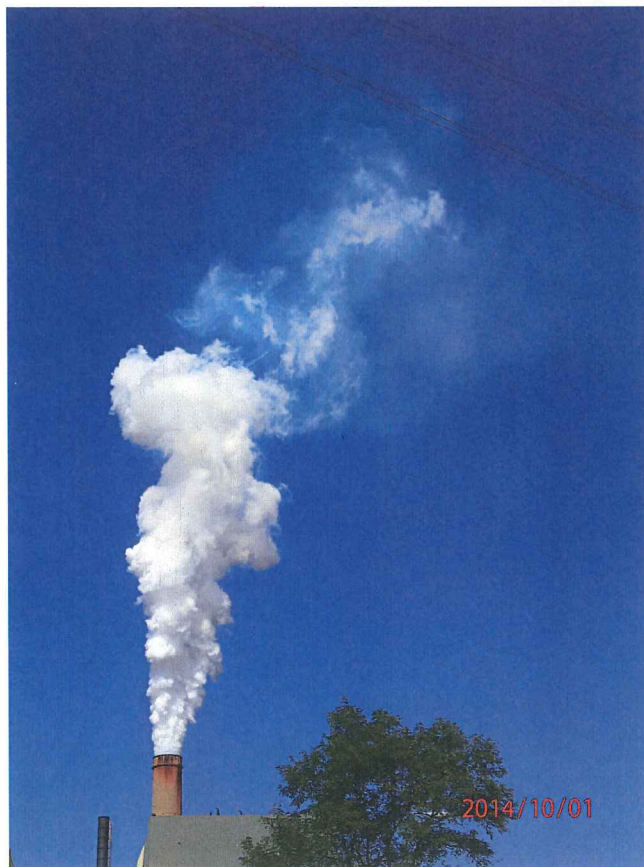


Photo No. PA010035	Date and Time: Oct 1, 2014 at 2:31 PM	Description: Main Boiler (B006) Plume
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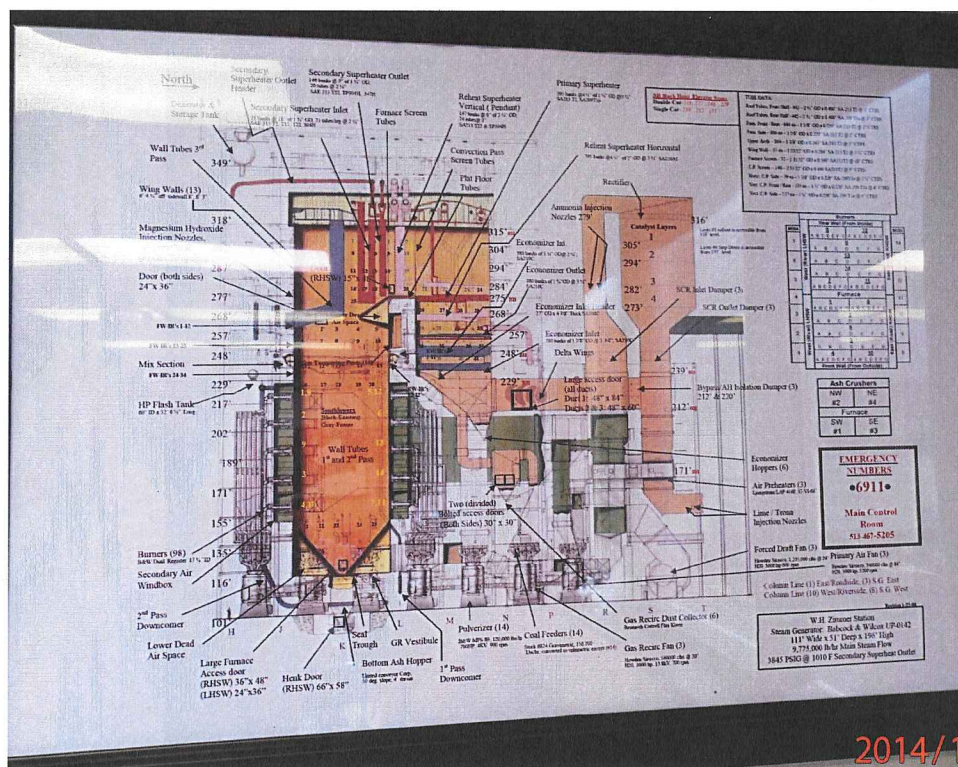


Photo No. PA010036	Date and Time: Oct 1, 2014 at 3:16 PM	Description: Updated Boiler Diagram in Conf. Room
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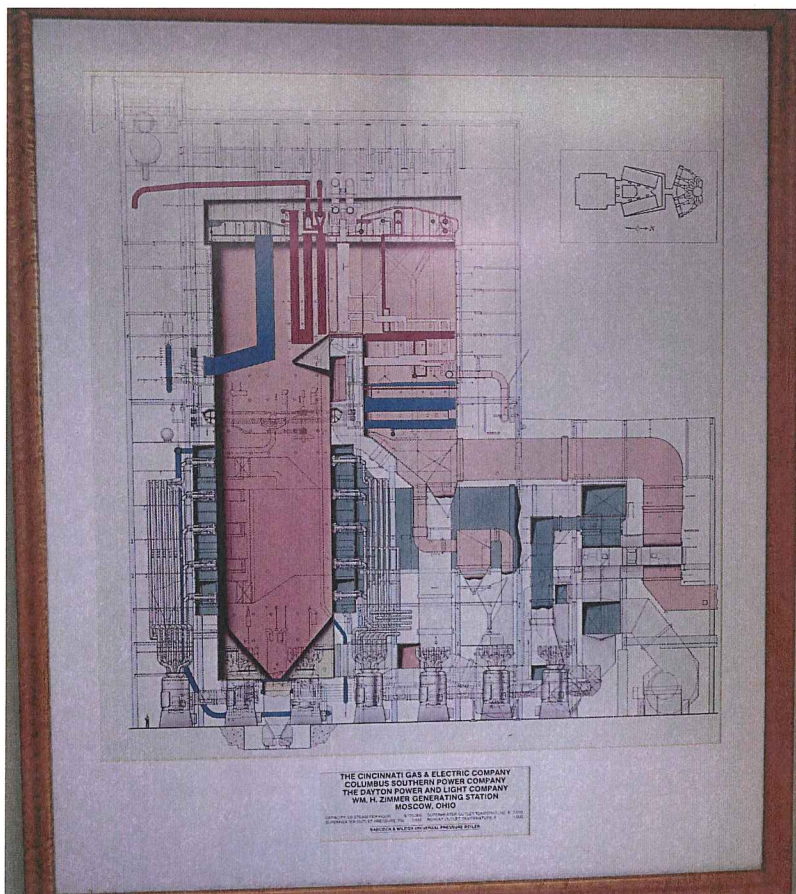


Photo No. PA010039	Date and Time: Oct 1, 2014 at 3:16 PM	Description: Original Boiler Diagram in Conf. Room
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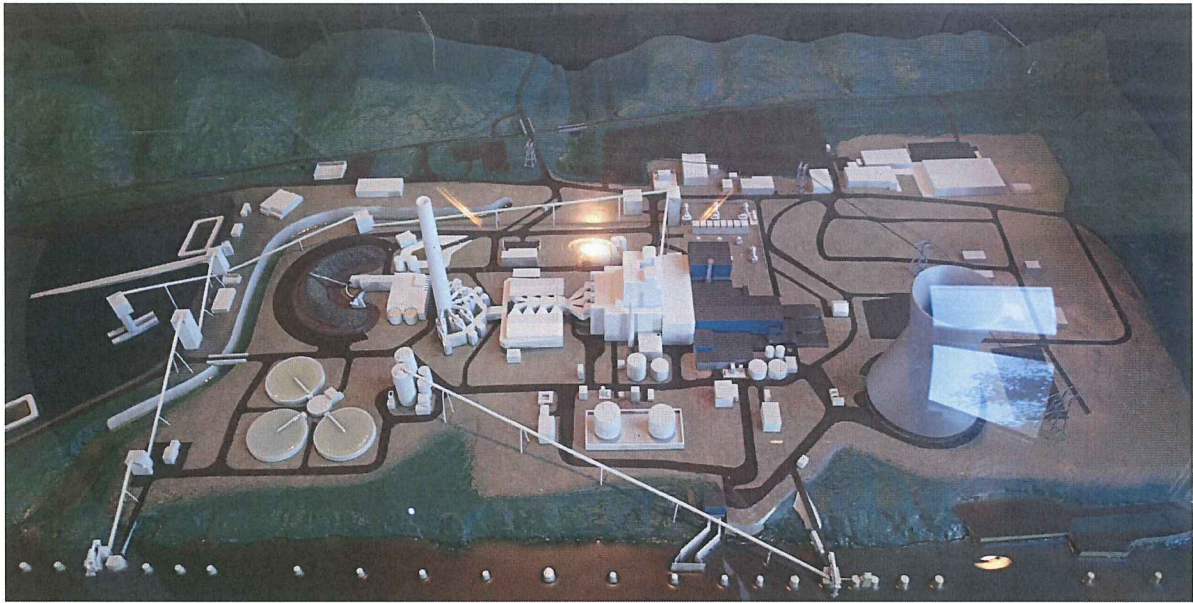


Photo No. PA010040	Date and Time: Oct 1, 2014 at 4:04 PM	Description: Model of plant in lobby
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Photo No. PA010041	Date and Time: Oct 1, 2014 at 4:08 PM	Description: SCRs on top and air heaters on bottom
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Photo No. PA010042	Date and Time: Oct 1, 2014 at 4:09 PM	Description: FGD Modules surrounding stack
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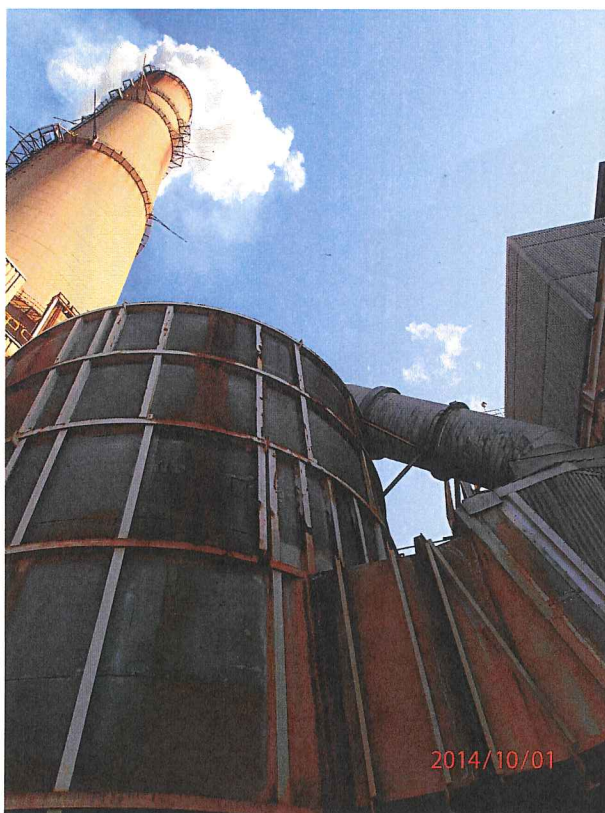


Photo No. PA010044&5	Date and Time: Oct 1, 2014 at 4:29 PM	Description: Location of old bypass, blocked now
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Photo No. PA010046	Date and Time: Oct 1, 2014 at 4:31 PM	Description: FGD Module
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Photo No. PA010048&9	Date and Time: Oct 1, 2014 at 4:37 PM	Description: SO ₃ Mitigation System (sorbent silos)
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